

# 1.0 Mercury Workgroup

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## Progress Toward Challenge Goals

For mercury, the Great Lakes Binational Toxics Strategy (GLBTS), sets a challenge goal of seeking “.....by 2006, a 50 percent reduction nationally in the deliberate use of mercury and a 50 percent reduction in the release of mercury from sources resulting from human activity.” The baselines for this challenge are the most recent inventory years available at the time the Strategy was signed — 1995 for mercury use and 1990 for mercury releases.

It is difficult to evaluate progress in the U.S. over the last year toward the goal of reducing mercury use and release by 50 percent nationally by 2006. Mercury emissions decreased approximately 25 percent between 1990 and 1996, with significant additional reductions occurring through the present as the result of controls on incineration of medical and municipal wastes. Figure 1-1 illustrates this reduction and provides an estimate of projected 2001 U.S. mercury emissions, compared to the GLBTS goal of a 50 percent reduction by 2006 (from a 1990 baseline). For more information, see <http://www.epa.gov/region5/air/mercury/progress.html>.

While mercury use declined in the late 1990s, recent progress over the last two years is difficult to gauge given changes in the sources of data about mercury consumption. Figure 1-2 provides an estimate of projected U.S. mercury use for 2001, in comparison to the GLBTS goal of a 50 percent reduction by 2006 (from a 1995 baseline). For a more detailed evaluation of data and assessment of progress, see <http://www.epa.gov/region5/air/mercury/progress.html>.

Reduced levels of mercury in sewage sludge provide one indication that reductions in mercury use and release are having an impact. In New York State, the typical concentration of mercury in sewage sludge from wastewater treatment plants has decreased from 7ppm dry weight during 1980 through 1989 to approximately 2.5 ppm today. As a result, many sludges can be used beneficially as fertilizers throughout the State.

In Canada, mercury releases have been reduced by 78 percent from the 1988 baseline. Figure 1-3 illustrates the progress made toward the Canadian 90 percent reduction target. This figure shows that releases in Ontario have been cut by more than 11,000 kg since 1988, based on Environment Canada’s 2000 mercury inventory.

## Workgroup Activities and the 4 Step Process

The focus of the Mercury Workgroup has been on Steps 3 and 4: the examination and implementation of reduction options, and the development of partnerships and commitments. The following draft reports have been posted to the GLBTS web site: U.S. Sources and Regulations (Steps 1 and 2) (<http://www.epa.gov/glnpo/bns/mercury/stephg.html>), and Mercury Reduction Options (Step 3) (<http://www.epa.gov/glnpo/bns/mercury/>)

## Reduction Activities

Numerous mercury reduction activities are occurring in Canada, to meet the goal of reducing releases of mercury in the Great Lakes Basin, and in the U.S. to meet the goal of reducing the deliberate use of mercury and releases of mercury nationwide. The following is a selection of activities reported by Mercury Workgroup participants. Links to web sites with additional details about many of these activities



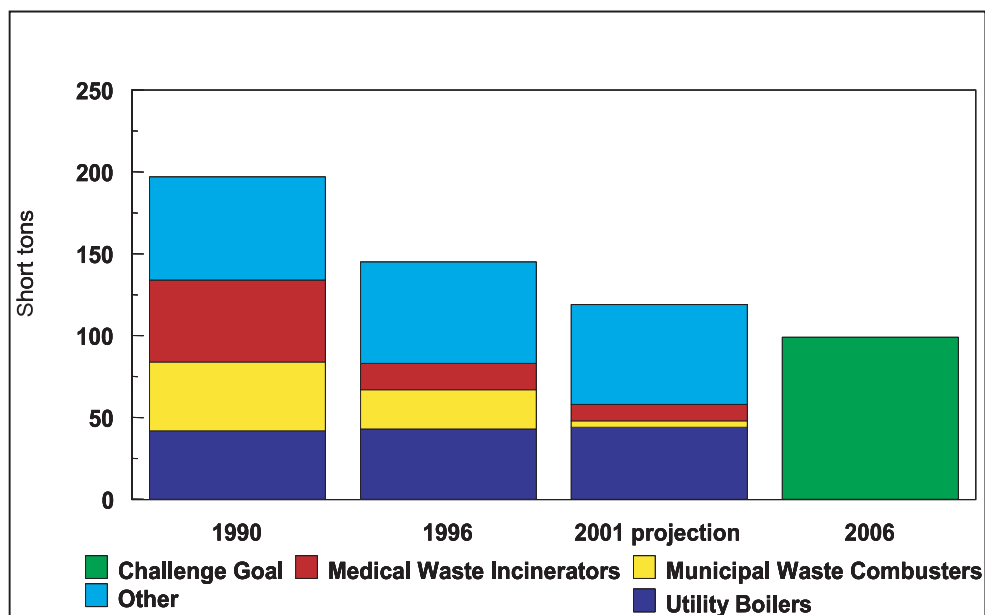


Figure 1-1. U.S. Mercury Emissions: 1990 Baseline, 2006 Challenge

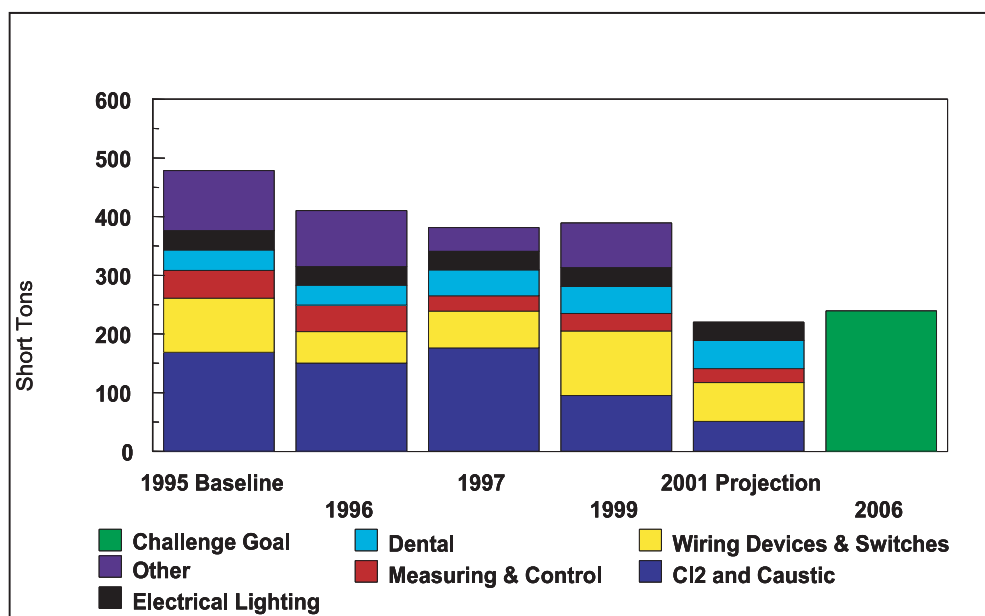
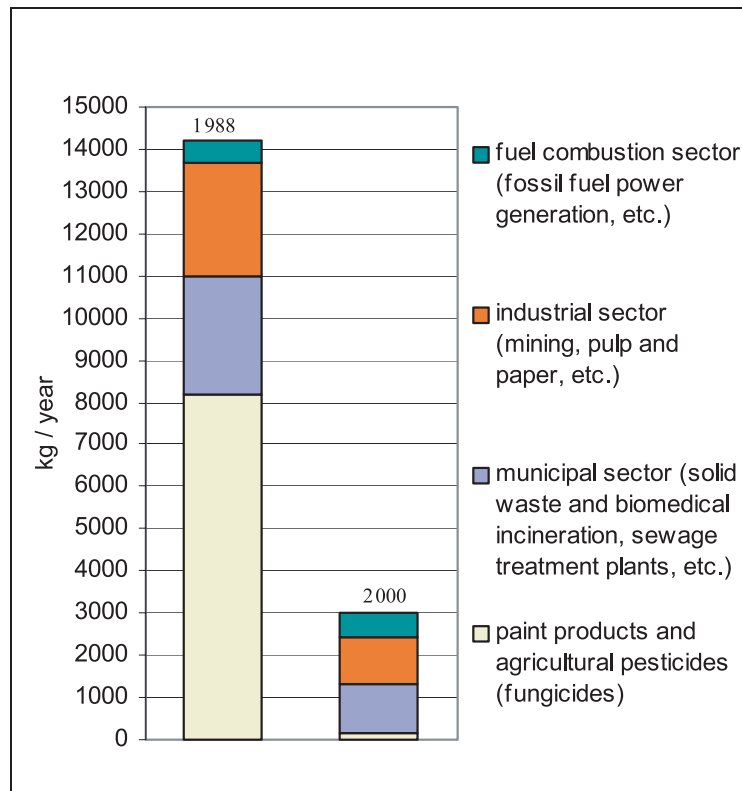


Figure 1-2. U.S. Mercury Use: 1995 Baseline, 2006 Challenge





**Figure 1-3. Reductions in Mercury Emissions in Ontario from 1988 to 2000, by Sector**



can be found at <http://www.epa.gov/Region5/air/mercury/mercury.html>.

**Chlor-Alkali Industry:** This U.S. industry, through the Chlorine Institute, committed (in 1996) to reducing mercury use 50 percent by 2006. Efforts have involved meetings to address technology issues, plant visits by USEPA, industry workshops, technology transfers between members, and reports of individual company's activities to achieve the goal. The industry reported in April 2001 that it has reduced mercury use by 44 percent, in addition to reductions that were the result of decreasing production capacity, between 1995 and 2000. In addition, during the past year the Institute has produced "Guidelines for Mercury Cell Chlor-Alkali-Plants Emission Control: Practices and Techniques" and has cooperated with USEPA on the development of draft proposed maximum available control technology regulations for chlor-alkali plants.

**Medical Sector:** Under the Memorandum of Understanding between the American Hospital Association and USEPA, Hospitals for a Healthy Environment (H2E) has produced a Mercury Virtual Elimination Plan for U.S. hospitals. In addition, workgroups are implementing work plans on various aspects of hospital waste reduction and on eliminating the use of mercury-containing products. In addition, H2E has consolidated a number of small pledge programs into a single program; initiated a process to increase public participation; and, designed an awards program which recognizes the various levels of mercury reduction activities within both health care and non-health care settings. This year the American Hospital Association reconfirmed its commitment to the H2E program.

With the support of EPA's Great Lakes National Program Office, the National Wildlife Federation (NWF) expanded its Mercury-Free Medicine campaign. This project, undertaken in partnership with the Health Care Without Harm Campaign, seeks to convince health care providers to eliminate mercury in their facilities, thereby reducing and ultimately eliminating the mercury in their waste. This past year, fifteen additional hospitals in the region signed a pledge to become mercury-free, and 78 clinics in the Saginaw Bay watershed made the commitment to stop using mercury in their facilities.

NWF also worked with a coalition of organizations to help convince the Henry Ford Hospital to shut down its medical waste incinerator and use waste disposal methods that do not cause significant mercury emissions. In all, over 160 facilities in the Great Lakes states have pledged to become mercury-free.

USEPA awarded a Pollution Prevention Environmental Justice grant to the St. Clair (IL) County Health Department to promote alternatives to mercury-containing devices among local health care facilities. This project, which takes place in the 'Gateway' area near St. Louis, is considered a model for comparable opportunities, including those in the Great Lakes Basin.

The Indiana Mercury Reduction Pledge Program for Hospitals currently has eight participants, and many other Indiana hospitals are working toward removing mercury-containing equipment from their facilities. The mercury pledge also gives the Indiana Department of Environmental Management an opportunity to work with hospitals on other solid and hazardous waste issues. Under a grant from USEPA, the New York State (NYS) Departments of Health and Environmental Conservation (DEC) are conducting an outreach program for health care facilities located in New York State that includes workshops, on-site visits and other informational activities. A task group is being established by the NYSDEC to evaluate barriers and issues related to proper hazardous waste management practices that reduce the release of mercury and dioxins to the environment.

In March 2001, the Canadian Centre for Pollution Prevention (C2P2), with support and input from Environment Canada, completed pollution prevention training to health care professionals in Toronto, London, and Thunder Bay, Ontario. To assist health care professionals, C2P2 also developed a resource guide to pollution prevention. On-line pollution prevention information is also available for health care professionals at [www.c2p2online.com](http://www.c2p2online.com). The website includes mercury reduction information and several case studies for hospitals which have mercury reduction programs, including: Toronto Hospital for Sick Children, Cambridge Memorial, Orillia Soldiers Memorial, University Health Network (formerly Toronto General, Toronto



Western, Princess Margaret, Toronto Medical Laboratories), and St. Marys Hospital in Kitchener, Ontario.

A new organization called the Canadian Coalition for Green Health Care has recently been established to reduce the environmental impact of Canada's health care system. Members of the coalition include the Canadian Association of Physicians for the Environment, Canadian Centre for Pollution Prevention, Canadian College of Health Services Executives, Canadian Medical Association, the Canadian Nurses Association, Canadian Public Health Association, Canadian Society for Environmental Medicine, College of Family Physicians of Canada, Great Lakes United, Toronto Hospital for Sick Children, Pollution Probe, Toronto Environmental Alliance/Health Care Without Harm. The web site for the organization is [www.greenhealthcare.ca](http://www.greenhealthcare.ca). The web site contains information on Canadian suppliers of mercury-free medical devices.

The Ontario Hospital Association's (OHA) annual convention was held on November 5 to 7, 2001. The convention included a dedicated area of exhibits for environmentally beneficial products and services, including mercury reduction information. The Canadian Coalition for Green Health Care and the OHA have established the Ontario Green Health Care Awards, the first of which were announced at the convention.

#### **Industrial Use of Mercury-Containing Devices:**

Bethlehem Steel Burns Harbor, Ispat Inland-East Chicago, and US Steel-Gary have developed mercury reduction plans, focusing primarily on mercury-containing devices, under a voluntary agreement with USEPA, Indiana Department of Environmental Management, and the Lake Michigan Forum. They are also promoting mercury reduction among their suppliers, and with the Delta Institute, have developed a Mercury Reduction Guide for Industry. Wisconsin Electric Power (WEPCo) completed a survey in 1999 which showed that mercury-containing equipment in WEPCo's power plants totaled approximately 250 pounds of mercury. In 2001, WEPCo removed mercury-containing equipment from two older Presque Isle Power Plant units which contained a total of approximately

100 pounds of mercury. The remaining mercury is largely contained in hundreds of switches and thermostats located throughout five major coal-fired power plants and three combustion turbine complexes.

**Mercury in Schools:** The University of Wisconsin extension office has created a website ([www.mercury-k12.org](http://www.mercury-k12.org)) and list server to share information about mercury in schools, including mercury reduction opportunities and mercury cleanup, curriculum, and policy approaches. This effort has also involved presentation of "mercury in schools" workshops to forums of teachers and administrators in the Great Lakes Region. These presentations will also be given in other USEPA Regions, with USEPA funding.

Many Great Lakes states are implementing school mercury reduction programs. Legislation has been passed in Michigan and Indiana prohibiting the use of mercury in schools.

As part of a school program in London, Ontario, called "E.A.S.E.," project materials and workshops were delivered with great success in over 20 schools across the Thames Valley District School Board and London District Catholic School Board. Students were engaged during an interactive presentation and took information home for household mercury audits. Project materials are also available for other communities.

Mercury lessons and activities for Grades 1-8 are available on the Environment Canada website at [www.on.ec.gc.ca/glimr/classroom/millennium/mercury/intr-e.html](http://www.on.ec.gc.ca/glimr/classroom/millennium/mercury/intr-e.html).

**Batteries:** The National Electrical Manufacturers Association (NEMA) conducted its annual surveys of mercury levels in alkaline batteries collected in recycling programs in Camden County, New Jersey, Lee County, Florida, and Hennepin County, Minnesota. Average mercury levels were 259 ppm in Lee County, 365 ppm in Camden County, and 388 ppm in Hennepin County. Alkaline batteries contained roughly 10,000 ppm before the battery industry began to eliminate mercury from alkalines in the late 1980s. NEMA projects that the mercury levels will decline by 50 percent every two years. Another survey conducted by NEMA concluded





that all button cells sold by NEMA manufacturers in the U.S. during 2000 contain roughly 2 tons of mercury.

**Lamps:** A survey of NEMA lamp manufacturers and Panasonic Lighting indicated that mercury levels in lamps have declined from roughly 27 tons in 1990 to 11 tons in 2000. Based on an estimate of lamps recycled in 2000 and sales of lamps by NEMA manufacturers in 1995, NEMA estimates that national lamp recycling levels reached approximately 24 percent in 2000. Lamp recyclers report that the number of lamps they process grew from 75 million lamps in 1997 to 130 million lamps in 2000.

Eco Superior Fluorescent Lamp Recycling is a coordinated effort to recycle spent fluorescent lights on the Canadian side of the Superior Basin. The following organizations in Thunder Bay, Red Rock, and Marathon, Ontario, are part of this effort: Bowater Pulp and Paper, Bombardier Transportation, Provincial Papers, Smurfit-Stone Packaging, City of Thunder Bay, Lakehead University, Confederation College, Ontario Power Generation, Abitibi-Consolidated, Norampac Packaging (Red Rock), and Marathon Pulp. All of these facilities now recycle fluorescent lamps. Thousands of spent lights have already been recycled. Eco Superior is currently working with consortium participants to review all costs associated with the operation of this program, and examine concrete measures for efficiencies. This may include the use of one central collection point for all consortium members, rather than pickup at individual facilities. Once all possible steps have been taken to reduce costs, Eco Superior hopes to expand this program to other Lake Superior Basin communities.

Access to collection facilities in Ontario for household lamps has increased significantly over the past year. Households can now return lamps to 15 municipally run facilities cities in Ontario, including: Toronto, Region of Peel, Region of Durham, London, Ottawa, Sudbury, Chatham-Kent, Guelph, Brantford, Kawartha Lakes, County of Northumberland, County of Wellington, Hawkesbury, Township of Augusta, and Bayham. In total, over 2 million households in Ontario have access to lamp collection facilities.

**Dentistry:** All of the Great Lakes states' dental

associations have published and distributed "*Amalgam Recycling and Other Best Management Practices*," a document developed with funding provided by the Great Lakes Protection Fund.

The Ontario Dental Association has developed a "*Best Management Practices*" manual, which includes information concerning amalgam separators. The manual has been distributed to all Ontario dentists. The City of Toronto has passed a sewer use bylaw that requires amalgam separators to be installed in all Toronto dental practices by January 1, 2002. Canada Wide Standards have been proposed for dental amalgam which would require the application of "Best Management Practices," including the installation of an ISO-certified trap or its equivalent in order to achieve a national 95 percent reduction in mercury releases from dental practices by 2005, from a base year of 2000.

The Federal, Provincial, and Territorial Environment Ministers across Canada have agreed to a harmonized standard for managing dental amalgam waste across the country. Ministers signed a Canada Wide Standard on September 23, 2001 in The Pas, Manitoba. The Canada Wide Standard is an application of best management practices to achieve a 95 percent national reduction in mercury releases from dental amalgam waste discharges to the environment from a base year of 2000.

The Indiana Department of Environmental Management (IDEM) met with the Indiana Dental Association's (IDA) Council on Dental Health on September 12, 2001, and discussed various options for mercury reduction programs. No formal agreements have been made, but IDEM will continue to work with IDA.

### **Dental Wastewater Collection and Recycling System:**

A grant to the University of Illinois at Chicago College of Dentistry entitled, *Dentist Recycling and Awareness Training Module*, is intended to reduce some of the mercury loadings to wastewater facilities from dental offices and clinics by using relatively simple changes in dental amalgam disposal practices. Given stricter mercury discharge standards, the mercury loading from dental practices and other small sources may influence the ability of treatment facilities to meet National Pollutant Discharge Elimination System (NPDES)



permit requirements. Research has indicated that over 50 percent of the mercury in dental wastewater can be collected from particles caught in the in-line trap.

**Dental Wastewater Characterization:** Through an interagency agreement, an award entitled “*Mercury Removal from the Dental-Unit Wastewater Stream*” was given to the U.S. Navy, Naval Dental Research Institute, Great Lakes, Illinois. The purpose of this initiative is to characterize both organic and inorganic mercury in the dental wastewater stream and to identify efficacious and cost-effective methods of removing heavy metals from this waste stream.

**Thermometers:** Coalitions including Health Care Without Harm and the NWF have successfully encouraged several U.S. retailers to stop the sale of mercury-containing thermometers to the public and have promoted bans on the sale of mercury fever thermometers. Such bans have been enacted in several states and local jurisdictions. The Michigan Department of Environmental Quality is working with local institutions to conduct mercury thermometer exchanges across the state. IDEM is sponsoring thermometer exchanges with various partners, holding twelve events in the last six months. Visit [www.in.gov/idem/mercury](http://www.in.gov/idem/mercury) for a detailed list of events and results for 2000 and 2001. IDEM has also experimented with thermometer exchanges on Headstart Program buses (allowing children to bring in a mercury thermometer from home and have it replaced with a digital thermometer). IDEM is considering the effectiveness of this approach as an outreach tool for some communities.

Fever thermometers containing mercury continue to be distributed to the Canadian public, despite the availability of alternatives such as digital thermometers. Environment Canada is actively engaged with Canadian retailers and distributors to work toward ending the sale of mercury-filled thermometers to the general public.

Environment Canada is also working with retailers and distributors to implement a program to encourage the public to return mercury-containing thermometers to pharmacies. The program will collect and recycle mercury from fever thermometers

by increasing public awareness of mercury products in the home. Environment Canada is planning a pilot scale Mercury Fever Thermometer Take Back Program for volunteering retail pharmacies in Thunder Bay, London, and Ottawa. The Pilot Program is scheduled for February 2002.

Pollution Probe held a small-scale mercury thermometer exchange at the City of Toronto Fall 2001 Environment Days. Promotion of the exchange appeared on the city’s website and in literature distributed by city council members. The public was encouraged to bring mercury thermometers for proper disposal at an on-site household hazardous waste truck, and the first 25 people each day received a free digital thermometer. Initial response from the public has been very positive. There exists great opportunity to work with the city in years to come to heighten the public’s awareness of mercury use in the home; promote mercury-free products such as electronic thermostats; and, encourage proper disposal of mercury-containing products.

**Thermostats:** The Thermostat Recycling Corporation (TRC) collected 24,362 thermostats and processed over 210 pounds of mercury from wholesalers in the first half of 2001. This represents nearly a doubling of thermostats and more than a doubling of mercury collected during the same period last year. The TRC has collected over 99,000 thermostats and processed roughly 860 pounds of mercury since it began operation in 1998. The TRC expanded its program in 2001 to cover all the lower 48 states. Over 1,000 TRC containers are in HVAC wholesale stores across the U.S.

Eco Superior has established a thermostat program in Ontario. So far, thermostat recycling depots have been set up in Thunder Bay and in every community on the North Shore of Lake Superior with a hardware store. This includes Nipigon, Schreiber, Terrace Bay, Marathon, White River, and Wawa. Next, Eco Superior hopes to expand this program into Sault Ste. Marie, Ontario.

**Dairy Manometer Replacement:** The Wisconsin Department of Natural Resources and the Department of Agriculture have conducted a dairy mercury manometer replacement program to allow dairy farmers to replace their mercury manometers for electronic manometers at a discounted price.



Dairy equipment dealers are given money to partially cover the cost of mercury manometer removal and replacement, and a contractor picks up the removed manometers for recycling. Approximately 375 mercury manometers have been recycled through this program.

The New York DEC has completed a survey of the use of mercury manometers at dairy farms in New York State and is currently evaluating the survey results. Identification and evaluation of non-mercury containing manometers is also part of this project which is funded by a grant from USEPA.

**Appliances:** The Ontario White Goods Collection and Mercury Switch/Sensor Removal Pilot were launched in April 2001 in the Regional Municipality of Niagara. To date, some 760 appliances have been segregated for inspection at the two sites. Of these, 97 were found to contain mercury switches. Assuming the average mercury content of each switch to be 3.5 grams, the total amount of mercury collected to date is 340 grams. Upon completion of the pilot in December 2001, a cost analysis and procedures manual will be available for other municipalities in Ontario who are being kept informed of the pilot through the Association of Municipal Recycling Coordinators. Workshops on expanding the program will take place in Spring 2002. Another municipality, Owen Sound, has already begun removing mercury switches as part of a white goods program.

**Household and Small Business Mercury Outreach and Collection:** Several Great Lakes states have conducted numerous successful mercury collection programs. For instance, since October 1998, Indiana has collected over 4,500 pounds of mercury and mercury-containing items from households. Bowling Green State University, in conjunction with the Ohio EPA and other private and public entities, collects uncontaminated elemental mercury from citizens, academic institutions, medical facilities, industries, and any other sources. This free program has collected more than 2,500 pounds of mercury throughout Ohio, southern Michigan, eastern Indiana, and western Pennsylvania, in addition to mercury collected through thermometer exchange projects. The

Wisconsin Mercury Recycling Program is in progress in eight Wisconsin mercury reduction communities. This program allows households and businesses to recycle almost all mercury-containing items for free, or at low cost, at local Clean Sweep events and Household Hazardous Waste Facilities. This program was designed to last one year but may be extended for one more year. In addition, Dane County, Wisconsin, has put together a mercury reduction plan and is working with respective interest groups, according to the plan's priorities, which include thermostats, switches in autos and appliances, fluorescent lights, medical facilities, and schools.

In the fall of 2000, Illinois EPA sponsored residential mercury collections at 30 suburban Chicago fire stations and four city stations, collecting 1,365 pounds of mercury. The total cost of this program was \$41,494.

In 2001, the Menominee Tribe-County collected 100 pounds of mercury (including packaging-container weight) in a household hazardous waste collection during a one-day collection event. The event also collected 300 pounds of fluorescent lamps from households. In addition, a tribe-county program recycles fluorescent lamps from public buildings and the Menominee Casino-Hotel.

The NY DEC's Pollution Prevention Unit was awarded a grant from the USEPA in 2001 to conduct outreach to plumbers in NYS on the use of mercury-containing manometers used to test natural gas lines. This project will involve development of outreach materials; model local ordinance language; and, other means of educating plumbers about the risks associated with the use of mercury-containing pressure testing devices.

**Automobiles:** The Alliance of Automobile Manufacturers, which represents auto manufacturers with operations in North America, committed to the eventual phase-out of mercury switches used in auto convenience lighting and agreed to work cooperatively with States on pilot programs to encourage auto dismantlers and scrappers to remove mercury switches. The Michigan Department of Environmental Quality (MDEQ) has led discussions with the Automobile Alliance and the Automotive Recyclers of Michigan. DaimlerChrysler has



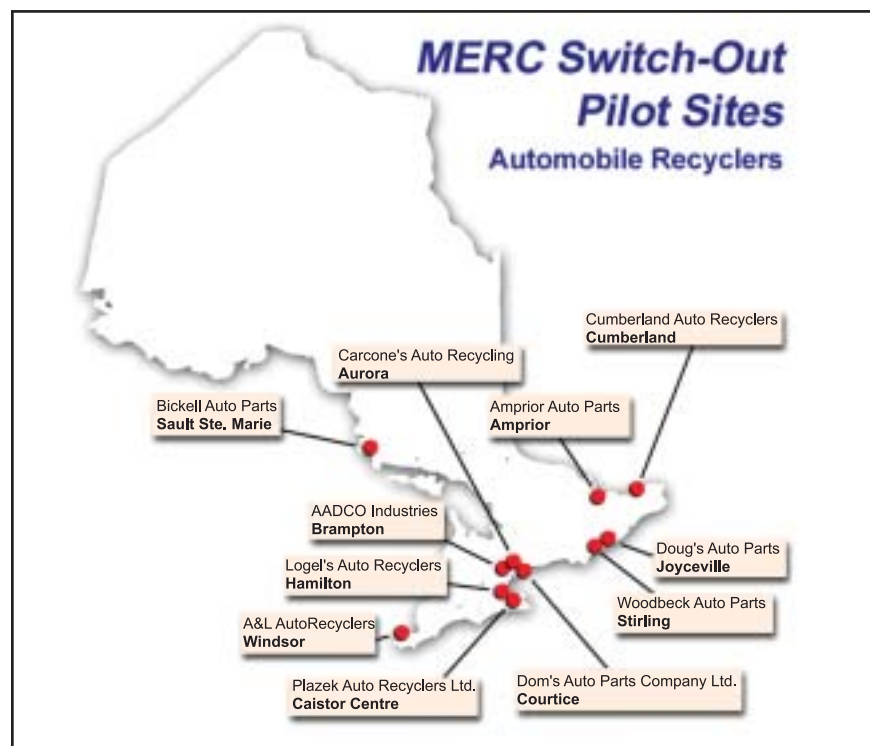


completely phased out mercury-containing light switches, and Ford has provided a verbal commitment to phase out mercury-containing light switches by 2002. General Motors projects that mercury convenience lighting switches will be phased out of all but one low-volume vehicle line by the 2002 model year, with all mercury-containing switches replaced by the late summer 2002.

A “clean sweep” to collect mercury switches from vehicles currently in Michigan salvage yards was conducted during September and October, 2000, and recycling programs continue. The NY DEC has been implementing programs to remove switches from vehicle fleets and scrapped vehicles. A grant was given to Erie County, New York, for an automotive switch recycling project that consists primarily of outreach to Erie County scrap and salvage yards, as well as, the collection and disposal of automotive mercury switches removed from vehicles prior to crushing and shredding. The Wisconsin Department of Natural Resources is developing a mercury switch removal project, in conjunction with automotive recyclers.

In June 2001, Pollution Probe initiated the Switch

Out Program, Canada’s first program to recover mercury switches from end-of-life automobiles before the mercury contained in the vehicles can be released to the environment. With funding from Ontario Power Generation, the Ontario Ministry of the Environment, and Environment Canada, and in partnership with the Ontario Automotive Recyclers Association, the Switch Out Program collected mercury convenience lighting switches from 11 auto dismantlers across Ontario over a six-month period. The name and location of these facilities are presented in Figure 1-4 (map courtesy of Pollution Probe). The pilot project was extremely successful, both in terms of meeting the collection target of 2,500 switches and the response from the auto dismantling industry. Preliminary results demonstrate the potential for effective, cost-efficient collection programs for automotive switches to be implemented across Canada. For more information, see [http://www.pollutionprobe.org/merc/merc\\_so.htm](http://www.pollutionprobe.org/merc/merc_so.htm).



**Figure 1-4. Eleven Auto Dismantlers Participating in the MERC Switch Out Pilot Program in Ontario (map used with permission of Pollution Probe)**

### **Emissions from Coal-Fired Utility Boilers:**

In December 2000, USEPA made a determination that it would regulate mercury emissions from coal-fired power plants. USEPA will propose regulations by the end of 2003, and promulgate final rules by 2004. In addition, President Bush has proposed legislation that would reduce mercury emissions from power plants as part of a multi-pollutant strategy to reduce air pollution from the power generating sector.

In conjunction with an Information Collection Request (ICR) submitted by USEPA in 1999, Wisconsin Electric Power Company (WEPCo) initiated a comprehensive evaluation of mercury emissions and a screening assessment of



possible emission reduction strategies for coal-fired units, including voluntary testing of six additional units for mercury speciation. Preliminary work completed at WEPCo's Pleasant Prairie Power Plant suggested that sorbent injection is feasible but will likely be both costly and detrimental to fly ash sales for use in concrete due to elevated carbon concentrations. At this plant, sorbent injection removal effectiveness did not appear to be greatly influenced by modest changes in temperature. Testing performed in 2000 and 2001 of commercially available and proprietary SCR catalysts for possible co-removal of mercury were disappointing. Based on preliminary work, future SCR applications at sub-bituminous coal-fired boilers may not affect mercury speciation (e.g., the largely elemental mercury present in these flue gases will not be oxidized) or may make the mercury more removable with existing particulate controls, or by the possible addition of wet FGD devices. In 2000, as a result of the preliminary work, Pleasant Prairie Power Plant was selected by the U.S. Department of Energy as one of four existing power plants where sorbent injection will be tested as a mercury control strategy. Testing at Pleasant Prairie began in September 2001 and will take two months to complete. Tests will include: measuring mercury removal by a number of sorbents; "long-term" tests (two weeks) with the most promising sorbent under optimal operating conditions; impacts of sorbents on emissions of other hazardous air pollutants; impacts of injection on plume opacity; impacts of injection on fly ash chemistry/use in concrete; and, impacts of injection on balance of plant operations. The tests should allow more refined estimates of costs associated with this most promising mercury control strategy for Pleasant Prairie, as well as for other plants of similar construction and fuel use.

**Watershed Approaches:** The National Wildlife Federation (NWF) is working with USEPA, Region 5, and the states in the region to explore how states might use a pollution prevention approach and virtual elimination to satisfy their obligations under the Clean Water Act to develop mercury Total Maximum Daily Loads (TMDLs). TMDLs are plans each state must develop and implement to clean up impaired watersheds. Because each of the Great Lakes and thousands of inland lakes

and streams are impaired by mercury, the cost of developing such TMDLs can be enormous. Ohio estimated that the cost for its mercury TMDLs would be approximately \$25 million over 15 years. NWF, USEPA, and the states are exploring whether the states could commit to a twenty-year phase-out schedule for mercury sources within the state in lieu of expending the time and resources in preparing a TMDL plan which is likely to recommend the same outcome. USEPA has determined that a phase-out alternative could be structured to meet the states' TMDL obligations. USEPA is in the process of defining what that phase-out alternative would be.

**Ban on Mixing Zones:** USEPA finalized a regulation (Federal Register: November 13, 2000; Vol. 65, No. 219, pp. 67638-67651) that, to the greatest extent technically and economically feasible, will ban the use of mixing zones that allow discharges of bioaccumulative chemicals of concern (BCCs) into the Great Lakes Basin, subject to certain exceptions for existing discharges. A mixing zone is an area where pollutants are mixed with cleaner receiving waters to dilute their concentration in the water. Inside a mixing zone, discharges of toxic pollutants are allowed to exceed the water quality criteria set by a state, as long as the standards are met outside or near the boundary of the mixing zone. The final rule, "*Final Rule to Amend the Final Water Quality Guidance for the Great Lakes System to Prohibit Mixing Zones for Bioaccumulative Chemicals of Concern*," prohibits mixing zones for new discharges of BCCs and will phase out the use of existing mixing zones in the Great Lakes over the next 10 years. The regulation will eliminate discharges of up to 700,000 toxic pounds-equivalent annually of BCCs, including mercury, dioxin, PCBs, chlordane, DDT, and mirex, as well as 16 other highly bioaccumulative chemicals. Mercury discharges alone will be reduced by up to 90 percent. Five Great Lakes states – Illinois, Indiana, Michigan, Minnesota, and Wisconsin – already prohibit mixing zones for bioaccumulative chemicals of concern in the Great Lakes Basin, although the mixing zone ban in Wisconsin currently applies only to new dischargers. Under the new rule, any Great Lakes State or Tribe that has not adopted BCC mixing zone provisions as protective as those in the rule (e.g., New York, Ohio,



Pennsylvania) will have 18 months to adopt similar provisions prohibiting mixing zones.

**Ambient Mercury Monitoring:** IDEM, in partnership with the U.S. Geological Survey, has set up four mercury deposition stations throughout Indiana. Data being collected for both wet and dry deposition are just beginning to be evaluated. The Michigan Great Lakes Protection Fund (GLPF) has funded the Michigan Department of Environmental Quality (MDEQ) and the University of Michigan to establish mercury monitoring at three urban sites and two rural sites. In addition, mercury levels in water, sediments, and biota will be measured at an impacted urban lake in southeast Michigan with assistance from the MDEQ Surface Water Quality Division.

**Source Monitoring:** Under USEPA grants, Michigan, Wisconsin, Minnesota, Ohio, and Illinois are purchasing continuous elemental mercury vapor monitoring equipment for evaluating mercury emissions from a variety of sources. Through another USEPA grant, Oak Ridge National

Laboratory is providing assistance to States monitoring reactive gaseous mercury.

## Next Steps

The workgroup will continue to focus on information-sharing about cost-effective reduction opportunities, and tracking of progress towards meeting reduction goals. Continued improvements will be made to the web site and information about progress towards voluntary commitments will continue to be publicized.

Particular attention will be paid to information-sharing in areas where mercury releases are significant but there are no federal regulations existing or under development. For instance, the workgroup will attempt to focus attention on the contamination of metal scrap by mercury-containing devices and resulting emissions, and provide a forum for discussion of cost-effective approaches to addressing this problem. In addition, the workgroup will help share information about new reduction approaches that have been adopted in some jurisdictions, and which may provide a good example for others—for instance State or Provincial legislation or regulation affecting mercury in products, mercury in schools, dental mercury, and utility mercury emissions.

The workgroup will also seek to gain the involvement of stakeholders not previously engaged in the GLBTS process, including the Portland Cement industry, and additional representatives of the steel and scrap industries.



**Apostle Island National Lakeshore, Wisconsin**  
Photograph by Meg Turville-Heitz,  
Wisconsin Department of Natural Resources

